

ANALYTICAL CHEMISTRY

Read the details of the information given below from Skoog and West's "Fundamentals of Analytical Chemistry" book, which is recommended as a reference.

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Aqueous Solutions and Chemical Equilibria

The Chemical Composition of Aqueous Solutions

Chemical Equilibrium

Buffer Solutions

9A-1 Classifying solutions of electrolytes

Classification of Electrolytes	
Strong	Weak
<ol style="list-style-type: none">1. Inorganic acids such as HNO_3, HClO_4, H_2SO_4^*, HCl, HI, HBr, HClO_3, HBrO_32. Alkali and alkaline-earth hydroxides3. Most salts	<ol style="list-style-type: none">1. Many inorganic acids, including H_2CO_3, H_3BO_3, H_3PO_4, H_2S, H_2SO_32. Most organic acids3. Ammonia and most organic bases4. Halides, cyanides, and thiocyanates of Hg, Zn, and Cd

Electrolytes: Form ions when dissolved in water (or certain other solvents) and produce solutions that conduct electricity.

9A-2 Acids and bases

According to the Brønsted-Lowry theory,
an **acid** is a proton donor, and
a **base** is a proton acceptor.

Conjugate acids and bases



A **conjugate base** is formed when an acid loses a proton.



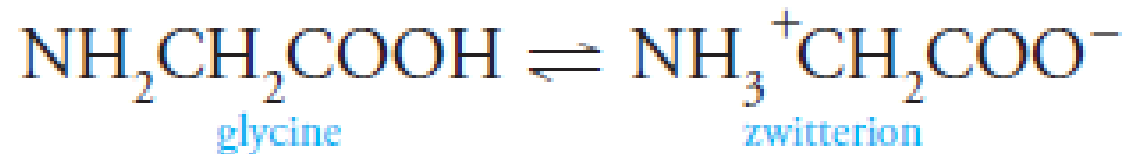
A **conjugate acid** is formed when a base accepts a proton.



9A-3 Amphiprotic species

Species that have both acidic and basic properties are **amphiprotic**.



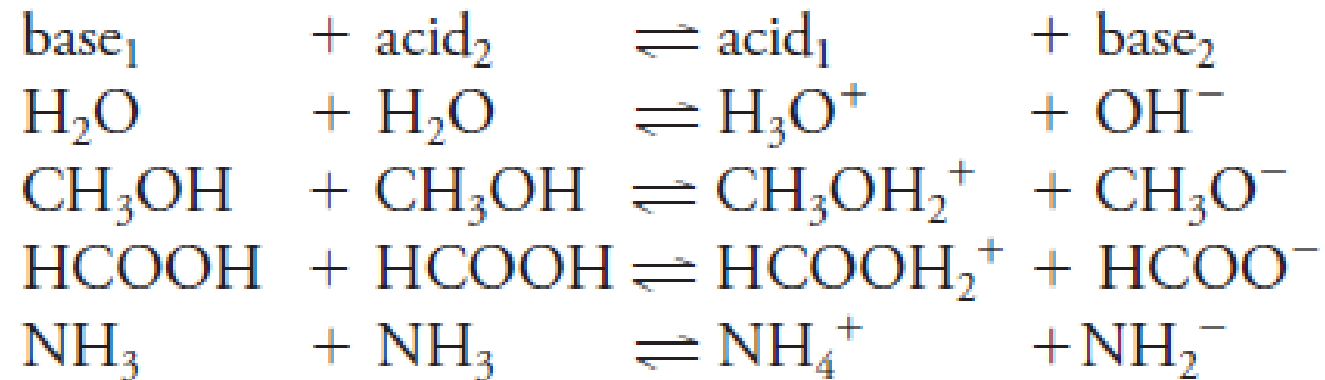


A **zwitterion** is an ion that has both a positive and a negative charge.

Amphiprotic solvents behave as acids in the presence of basic solutes and bases in the presence of acidic solutes. Water, methanol, ethanol, anhydrous acetic acid

9A-4 Autoprotolysis

Autoprotolysis (also called autoionization) is the spontaneous reaction of molecules of a substance to give a pair of ions.



9A-5 Strengths of acids and bases

The common **strong bases**

NaOH, KOH, Ba(OH)₂, and the quaternary ammonium hydroxide R₄NOH, where R is an alkyl group such as CH₃ or C₂H₅.

The common **strong acids**

HCl, HBr, HI, HClO₄, HNO₃, the first proton in H₂SO₄, and the organic sulfonic acid RSO₃H.